

IN THE SPECIFICATION:

Please amend paragraphs [001] - [004], [006], [009], [010], [012], [020], [033], [048], and [048] of the specification as shown below, in which deleted terms are shown with strikethrough and added terms are shown with underscoring.

Paragraph [001]

1. Field of the Invention

The present invention relates to a valve device for use in a silencer that is interposed mainly in an exhaust system for a vehicle engine, and more particularly to a valve device which opens a bypass passage for exhaust gas in the silencer when the exhaust gas pressure rises to a certain pressure.

Paragraph [002]

2. Discussion of Background Art

In general, a vehicle is required to ensure a sufficient engine output at a high speed rotating range in order to improve the performance during acceleration or high speed driving. Also, a vehicle is required to reduce exhaust noise in order to ensure calmness during idling or low speed driving. In other words, a vehicle is required to ensure a sufficient engine output at a high speed rotating range and is required to reduce exhaust noise of the engine at least at a low speed rotating range.

Paragraph [003]

It is known that sectional area of a passage that forms an exhaust system of a vehicle engine has a great influence on engine output and exhaust noise. That is, with increasing the sectional area of the passage, more sufficient engine output can be obtained due to decreased exhaust resistance, however, more exhaust noise occurs with this decreased exhaust resistance. On the contrary, with decreasing the sectional area of the passage, less exhaust noise occurs due to increased exhaust resistance, however, the engine output decreases due to this increased exhaust resistance.

Paragraph [004]

For this reason, Japanese Laid-open Patent Application No.2001-123817 (see page 3 and FIG. 2, etc.) suggests to provide a bypass passage in the exhaust passage of a silencer that is provided in the exhaust system of the engine. The bypass passage further includes a valve device so that the bypass passage opens only during the drive while driving at a high speed rotating range.

Paragraph [006]

However, exhaust gas pressure of the engine pulsates and the plate-like valve vibrates in accordance with the pulsation. Such vibration becomes greater at the distal end, and when the open/close vibration frequency confirms conforms with the natural frequency of the plate-like valve, the plate-like valve resonates. When resonance of the plate-like valve occurs, operation of the valve disadvantageously becomes unstable or unusual noise occurs.

Paragraph [009]

Because the plate-like valve is bent at both side edges thereof in a certain range extending from its distal end toward the proximal portion, the plate-like valve improves the stiffness against deflection at the time of opening/closing the valve, so that the plate-like valve deforms at its center proximity area that is remote from the distal end for a certain range. Generally, resonance is likely to cause occur at the distal end of the plate-like valve. However, the valve device according to the present invention is not likely to cause resonance because the flexural rigidity of the plate-like valve increases in a certain range from the distal end toward the proximal portion.

Paragraph [010]

In the The aforementioned valve device may further comprise a plate spring member, and the distal end of the plate spring member abuts on a surface of the plate-like valve to urge the plate-like valve toward a valve close position. The plate spring member is obliquely arranged relative to the plate-like valve such that an abutting position of the plate spring member against the plate-like valve shifts toward the proximal portion of the plate-like valve with an increase in a deflection amount of the plate-like valve. The plate spring member abuts on a reinforced area of the plate-like valve that is reinforced by bending the side edges of the plate-like valve.

Paragraph [012]

Further, according to this valve device, the plate spring member abuts on a reinforced area of the plate-like valve that is reinforced by bending the side edges. To be more specific, the distal end of the plate spring member abuts on the plate-like valve in a certain range from the distal end of the plate-like valve, i.e. a surface of the range where the plate-like valve is bent at both side edges. This can achieve stable operation of the plate-like valve because the plate spring member stably applies the urging force to the plate-like valve.

Paragraph [020]

As shown in FIG. 1, a silencer or muffler 1 interposed in an exhaust system for the engine includes a main body 10. The main body 10 consists of a tubular shell 11, and end walls 12, 13 for closing one end and the other end of the shell 11. The internal space of the main body 10 is divided into three sections by first and second separators 14, 15. Further, an exhaust gas inlet pipe 21, an inner pipe 22, and an exhaust gas outlet pipe 23 form passages for exhaust gas.

Paragraph [033]

Bent A bent angle of each bent portion 43d may be set desirably as long as the bent portion is bent in the direction remotely from the valve seat 42. For example, the bent portion 43d may be bent perpendicularly to the valve seat 42, or the bent angle may be approximately 45 degrees. Width of the plate-like valve 43 in an area sandwiched between the stopper member 46 and the valve seat 42 (size in the direction of Arrow X as shown in FIG. 2) is smaller than widths of the valve seat 42 and the stopper member 46.

Paragraph [043]

Manner A manner of fixing the plate-like valve 43, the stopper member 46, and the plate spring 47 will be described below. In FIGS. 2 and 3 to be referred herein, each thick broken line indicates a range to which welding is applied.

Paragraph [048]

The plate-like valve 43 and the stopper member 46 are fixed to the valve seat 42. The plate-like valve 43, then the stopper member 46 are superposed in this order onto the proximal portion 42a of the valve seat 42 such that the positioning holes 42b, 43b, and 46b are positioned to be overlapped. In this event, a reliable positioning can be achieved with the use of a pin, the diameter of which is in conformity with each of the positioning holes 42b, 43b, and 46b.